Claims

1. A multilayer ceramic capacitor comprises a layered dielectric body composed by alternately dielectric layers and internal electrode layers, and a pair of external electrodes are connecting to the internal electrodes alternately at the both end of the layered dielectric body, where in a tension stress in a direction of an electric field remains at a exposed face parallel to the direction of the electric field inside the layered dielectric body and the tension stress calculated by an X-ray diffraction measurement is a value not less than 50MPa.

2. The multilayer ceramic capacitor according to claim 1, wherein said internal electrode layer is composed of a nickel or nickel alloy and the average particle size of raw material powder for the internal electrode layer is not more than 0.5μm.

3. The multilayer ceramic capacitor according to claim 1, wherein said dielectric layers contains a barium titanate as a main component, a sintering aids, a first sub-component and a second sub-component, said sintering aids including silicon oxide as a main component and at least one of an M oxide (M is at least one element selected from a group consisting of Ba, Ca, Sr and Mg), lithium oxide and boron oxide, said first sub-component including at least one of oxides selected from magnesium oxide, calcium oxide, barium oxide, strontium oxide and chromium oxide, and said second sub-component including one of R1 oxides (R1 is at least one element selected from a group of consisting of Sc, Er, Tm, Yb, Lu, Y, Dy, Ho, Tb, Gd and Eu).

4. The multilayer ceramic capacitor according to claim 3, wherein said dielectric layers further contain at least one selected from V_2O_5, MoO_3, and WO_3 as a third sub-component.

5. The multilayer ceramic capacitor according to claim 4, wherein said the dielectric layers contain at least one selected from MnO and Cr_2O_3 as a fourth sub component.

6. A multilayer ceramic capacitor comprises a layered dielectric body composed by alternately dielectric layers and internal electrode layers, and a pair of external electrodes are connecting to the internal electrodes alternately at the both end of the layered dielectric body, wherein a compression stress in a direction connecting both the external electrodes remains at a exposed face parallel to the direction of the electric field inside the layered dielectric body and the compression stress calculated by an X-ray diffraction measurement is a value not less than 50MPa.

7. The multilayer ceramic capacitor according to claim 6, wherein said internal electrode layer is composed of a nickel or nickel alloy and the average particle size of a raw material powder for the internal electrode layer is not more than 0.5μm.

8. The multilayer ceramic capacitor according to claim 6, wherein said dielectric layers contains a barium titanate as a main component, a sintering aids, a first sub-component and a second sub-component, said sintering aids including silicon oxide as a main component and at least one of an M oxide (M is at least one element selected from a group consisting of Ba, Ca, Sr and Mg), lithium oxide and boron oxide, said first sub-component including at least one of oxides selected from magnesium oxide, calcium oxide, barium oxide, strontium oxide and chromium oxide, and said second sub-component including one of R1 oxides (R1 is at least one element selected from a group of consisting of Sc, Er, Tm, Yb, Lu, Y, Dy, Ho, Tb, Gd and Eu).

9. The multilayer ceramic capacitor according to claim 8, wherein said

dielectric layers further contain at least one selected from V_2O_5, MoO_3, and WO_3 as a third sub-component.

10. The multilayer ceramic capacitor according to claim 9, wherein said the dielectric layers contain at least one selected from MnO and Cr_2O_3 as a fourth sub component.

11. A multilayer ceramic capacitor comprises a layered dielectric body composed by alternately dielectric layers and internal electrode layers, and a pair of external electrodes are connecting to the internal electrodes alternately at the both end of the layered dielectric body, wherein a compression stress in a direction connecting both the external electrodes remains at an outer surface perpendicular to electric field direction of the layered dielectric body and the compression stress calculated by an X-ray diffraction measurement is a value not less than 100MPa.

12. The multilayer ceramic capacitor according to claim 11, wherein said internal electrode layer is composed of a nickel or nickel alloy and the average particle size of a raw material powder for the internal electrode layer is not more than 0.5μm.

13. The multilayer ceramic capacitor according to claim 11, wherein said dielectric layers contain a barium titanate as a main component, a sintering aids, a first sub-component and a second sub-component, said sintering aids including silicon oxide as a main component and at least one of an M oxide (M is at least one element selected from a group consisting of Ba, Ca, Sr and Mg), lithium oxide and boron oxide, said first sub-component including at least one of oxides selected from magnesium oxide, calcium oxide, barium oxide, strontium oxide and chromium oxide, and said second sub-component including one of R1 oxides (R1 is at least one element selected from a group of consisting of Sc, Er, Tm, Yb, Lu, Y, Dy, Ho, Tb, Gd and Eu).

14. The multilayer ceramic capacitor according to claim 13, wherein said dielectric layers further contain at least one selected from V_2O_5, MoO_3, and WO_3 as a third sub-component.

15. The multilayer ceramic capacitor according to claim 13, wherein said the dielectric layers contain at least one selected from MnO and Cr_2O_3 as a fourth sub component.

16. A multilayer ceramic capacitor comprises a layered dielectric body composed by alternately dielectric layers and internal electrode layers, and a pair of external electrodes which are connected to the internal electrodes alternately at the both end of the layered dielectric body, wherein a stress remains at the outer surface of layered dielectric body in a direction of perpendicular to the electric field direction, and the stress in a direction connecting both external electrodes is satisfied next equation, $LS = -Ln(n) \times B$ and $10 \leq B \leq 300$, in which n: number of dielectric layers; B: constant of proportion; LS: a value of the stress in a direction connecting to the both external electrodes at an outer surface of the layered dielectric body perpendicular to the direction of electric field therein calculated by an X-ray diffraction measurement; and Ln: natural logarithm.

17. The multilayer ceramic capacitor according to claim 16, wherein said internal electrode layer is composed of a nickel or nickel alloy and the average particle size of a raw material powder for the internal electrode layer is not more than 0.5μm.

18. The multilayer ceramic capacitor according to claim 16, wherein said dielectric layers contain a barium titanate as a main component, a sintering aids, a first sub-component and a second sub-component, said sintering aids including silicon oxide as a main component and at least one of an M oxide (M is at least

one element selected from a group consisting of Ba, Ca, Sr and Mg), lithium oxide and boron oxide, said first sub-component including at least one of oxides selected from magnesium oxide, calcium oxide, barium oxide, strontium oxide and chromium oxide, and said second sub-component including one of R1 oxides (R1 is at least one element selected from a group of consisting of Sc, Er, Tm, Yb, Lu, Y, Dy, Ho, Tb, Gd and Eu).

19. The multilayer ceramic capacitor according to claim 18, wherein said dielectric layers further contain at least one selected from V_2O_5, MoO_3, and WO_3 as a third sub-component.

20. The multilayer ceramic capacitor according to claim 19, wherein said the dielectric layers contain at least one selected from MnO and Cr_2O_3 as a fourth sub component.

21. A multilayer ceramic capacitor comprises a layered dielectric body composed by alternately dielectric layers and internal electrode layers, and a pair of external electrodes are connecting to the internal electrodes alternately at the both end of the layered dielectric body, wherein the thickness of each of the dielectric layer sandwiched with two internal electrode layers is not more than 5μm and the average grain size of dielectrics is not more than 0.6μm, the average grain size of conductive material in each of the internal electric layers being not larger than the average grain size of dielectrics, and the layered number of the dielectric layers being not less than 50.